News focus

Flu pandemic fears continue

With bird flu outbreaks continuing in south-east Asia and humans still becoming infected, health authorities are growing increasingly jittery about the prospects of a new flu pandemic developing and how little time they would have to tackle it. **Nigel Williams** reports.

The threat of a flu pandemic is greater than ever because of the continuing spread of the bird flu virus in south-east Asia, the World Health Organisation warned last month.

With bird flu outbreaks now being reported for more than 12 months, despite countermeasures, the possibility of a global epidemic that could kill millions of people is considered by some officials to be more likely than not. More than 50 people have died from the H5N1 avian flu virus in south-east Asia, most of them in Vietnam, where tens of thousands raise poultry in small backyard farms.

In its current form, the virus is difficult for humans to contract, but if it changes its genetic make-up, it could spread rapidly. If the virus infects a person who has the human flu virus, the two viruses may be able to shuffle their genes to create a deadly mix. A new strain could combine the lethal effects of the bird virus with the ability to spread easily among people supplied by the human virus.

"We are facing a serious situation not only in Vietnam, but in the region of avian influenza," said Hans Troedsson, a World Health Organisation (WHO) representative in Vietnam. "There is an extremely short window to contain the virus if it changes," he said.

WHO computer models suggest that a pandemic of a human virus containing H5N1 elements could kill between two and seven million in a "best case scenario" based on data from the "mild" pandemic of 1968. But if it were similar to the 1918 pandemic, the models estimate a much higher total.

Peter Horby, the WHO medical epidemiologist in Hanoi, said that, while the mortality rate from H5N1 infections was falling, the virus appeared to be adapting to human hosts, which was taken to be an indication that transmission between humans would become easier. "The fact that it has been around for a year and we haven't yet seen a pandemic is no reason to be complacent," he said. "I'm more concerned than I was a year ago." He estimated the probability

Ruffled feathers: A Vietnamese farmer takes chickens to market amid mounting concerns about the potential human impact of avian flu which appears to be continuing to occur in south-east Asia. (Picture: Associated Press.)

of a pandemic at "more than 50 per cent".

Dr Klaus Stohr, the WHO global influenza programme chief, reported an increase in the number of cluster cases reported recently, with the biggest being a family of five cases. There have been seven cluster cases in Vietnam, all within single families, most recently in the northern province of Haiphong.

No relative has been proved to have passed the disease to another in these cases but, Horby said, "the onset dates could be consistent with human to human transmission."

The WHO hopes to complete genetic analysis of virus samples from Cambodia and Vietnam shortly in order to see if there has been a significant change in the make-up of the virus. To date, there has been human-to-human transmission but none beyond 'one or two links in the chain', following close contact with a terminally ill patient.

"The moment we have the slightest suspicion of a change in the epidemiology, we would act very aggressively," Stohr said.

Based on historical patterns, influenza pandemics can be expected to occur, on average, three to four times each century when new virus subtypes emerge and are readily transmitted from person to person. In the twentieth century, the flu pandemic of 1918–1919, which killed up to 50 million, was followed by pandemics in 1957–1958 and 1968–1969. The viruses that caused these pandemics are all thought to have derived, at least in part, from avian strains. Most influenza experts agree that the prompt culling of Hong Kong's entire 1.5 million poultry population in 1997 probably averted a pandemic.

National authorities in south-east Asia are also monitoring the situation closely. One victim in Vietnam, which led to a family cluster of disease, kept more than 300 chicken and geese in his backyard. He fell ill with the disease shortly after some of his birds contracted it. His three-year-old daughter and he were diagnosed with the H5N1 virus and his wife and two other children later became ill too. In a preventative strike, the family's entire flock was killed within two hours of animal health officials arriving. Poultry within a three-kilometre radius were put under surveillance. The family was taken to an isolation ward and recovered.

The Vietnamese are taking the outbreak extremely seriously and have accepted technical help from the WHO, but its assistance in field investigations has been declined.

"We think it is only a matter of time before H5N1 or a related strain of the virus becomes infectious between humans," said John Oxford, a virologist at the Queen Mary and Westfield School of Medicine in London.

And, at a conference of bird flu experts in Ho Chi Min City earlier this spring, further alarm bells were sounded. The Vietnamese government was hopeful that its stringent anti-poultry measures with farmed birds were beginning to pay dividends. Since late 2003, agriculture officials had culled 44 million infected chickens, a sixth of the country's poultry population. And following this winter's outbreak, the government ordered a further 800,000 chickens to be killed, and banned sale of poultry at Ho Chi Min City's markets.

But in spite of these measures, public health experts at the conference warned that Vietnam faced another challenge from the birds roaming around the paddy fields and in human contact. In particular there were concerns that ducks, according to the latest evidence, were playing a silent role in the transmission of the disease, harbouring the virus and excreting it in their faeces for up to 17 days without showing any obvious signs of illness. "The public health implications of this are very serious," said Shigeru Omi, the WHO's Western Pacific regional coordinator. "How can people avoid exposure when they don't know which ducks are infected and which are not?"

But the hope is that such fresh concerns heighten current activity. "We have to prepare now," says Oxford.

Q & A

Francis Barr

Francis Barr is a Max-Planck Society independent group leader at the MPI of Biochemistry near Munich, Germany. He obtained his degree in Biochemistry at Imperial College, London, did his PhD in the group of Wieland Huttner at the EMBL in Heidelberg, Germany, and then a post-doc with Graham Warren at Cancer Research UK, Lincoln's Inn Fields, London. He has studied the role of membrane traffic in cell growth and division throughout his career.

What turned you on to cell biology in the first place? As a child I probably would have chosen to study human or veterinary medicine rather than biology. As I lack any fingers on my right hand because of a birth defect, medicine was, however, not an option for me. As a result, I drifted into an engineering degree, but hated it and then switched to biochemistry, which is something I have never regretted. As an undergraduate I had really excellent courses in cell biology organised by Dan Cutler and Colin Hopkins, and this is the main reason why I chose to do a PhD in cell biology. After sitting through many hours of lectures about biochemical pathways, I was amazed that cells were such fascinating and dynamic things. As a postdoc, I learned a lot from Graham Warren — he was a great person to have as an advisor.

Has your disability ever been a problem for your work? No, not really, except that my lab gloves don't fit properly. Scientists are judged by their achievements rather than their physical appearance. This is not true in many other jobs, which was something I realised as a student when I lost a part-time job because the customers did not like being served by someone with a disability.

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